

COSMOGENIC RARE GASES AND ^{10}Be IN A CROSS SECTION OF KNYAHINYA. R. Wieler, P. Signer, ETH Zürich, NO C61, 8092 Zürich, Switzerland; U. Herpers, R. Sarafin, Univ. Köln, Zülpicherstr.47, 5000 Köln, FRG; G. Bonani, H. J. Hofmann, E. Morenzoni, M. Nessi, M. Suter, W. Wölfli, ETH Zürich, HPK, 8093 Zürich, Switzerland.

We initiated a study of the concentrations of cosmogenic nuclides as a function of shielding on samples from a cross section of the 293 kg main fragment of the L5 chondrite Knyahinya. The stone broke into two nearly symmetrical parts upon its fall in 1866. The planar cross section has diameters between 40 and 55 cm. We measured He, Ne, and Ar on about 20 samples by mass spectrometry and determined the ^{10}Be activities on aliquots of 10 selected samples by AMS.

The noble gas data are presented in (1). Here we show the ^{10}Be data and compare the abundances of spallogenic nuclides with the model calculations reported by Reedy (2) for spherical L chondrites. The figure shows the ^{10}Be production rates in Knyahinya versus the shielding parameter $^{22}\text{Ne}/^{21}\text{Ne}$. Typical errors for ^{10}Be are $\pm 5\%$. In addition, production rates we determined on 13 individual chondrites (3) are also shown. Noble gases and ^{10}Be were measured on aliquots in all cases. The ^{10}Be production rates for H chondrites were normalized to L chondrite chemistry by multiplication with 1.075 (4).

The Knyahinya data are in good agreement with ^{10}Be determinations on the St. Severin core (5). The slopes of the linear best fits through these two sets of data points are equal within error limits. The $^{21}\text{Ne}/^{10}\text{Be}$ ratios in Knyahinya are constant within error limits over the whole section, indicating a comparable shielding dependence of the ^{21}Ne and the ^{10}Be production rates in this meteorite. In the individual chondrites, the ^{10}Be production rate appears to depend less on shielding than in Knyahinya. This is similar to the observed variations in a $^3\text{He}/^{21}\text{Ne}$ vs. $^{22}\text{Ne}/^{21}\text{Ne}$ diagram, where data from the meteorites Keyes and St. Severin do not coincide with the "Bern line" obtained on individual chondrite samples (cf. 1).

The observed noble gas profiles are in fair agreement with Reedy's model predictions for a spherical meteoroid of about 150 g/cm^2 (2), if we assume the area of maximum shielding observed in the cross section to correspond to the center of mass of the meteoroid. The postatmospheric surface closest to the meteoroid surface seems to have suffered an ablation of about 20 g/cm^2 . ^{10}Be activities in Knyahinya are up to about 25% higher than the largest values to be found according to the calculations in L chondrites of 150 g/cm^2 preatmospheric radius.

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